

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings of claims in the application:

Listing of Claims:

- 1 1. (Currently amended) A method of diagnosing the presence or severity of
2 liver fibrosis in an individual, comprising the steps of:
 - 3 (a) detecting α 2-macroglobulin (α 2-MG) in a sample from said individual;
 - 4 (b) detecting hyaluronic acid (HA) in a sample from said individual;
 - 5 (c) detecting tissue inhibitor of metalloproteinases-1 (TIMP-1) in a sample from
6 said individual; and
 - 7 (d) diagnosing the presence or severity of liver fibrosis in said individual based on
8 the presence or level of α 2-MG, HA and TIMP-1.
- 1 2. (Original) The method of claim 1, comprising detecting at most three
2 markers of fibrosis.
- 1 3. (Original) The method of claim 1, further comprising detecting in a
2 sample from said individual at least one marker selected from the group consisting of: PIIINP,
3 laminin, tenascin, collagen type IV, collagen type VI, YKL-40, MMP-3, MMP-2, MMP-
4 9/TIMP-1 complex, sFas ligand, TGF- β 1, IL-10, apoA1, apoA2, and apoB.
- 1 4. (Original) The method of claim 3, wherein said marker is YKL-40.
- 1 5. (Currently amended) The method of claim 1, further comprising detecting
2 in a sample from said individual two or more markers selected from the group consisting of
3 PIIINP, laminin, tenascin, collagen type IV, collagen type VI, YKL-40, MMP-3, MMP-2, MMP-
4 9/TIMP-1 complex, sFas ligand, TGF- β 1, IL-10, ~~apoA2~~ apoA1, apoA2 and apoB.
- 1 6. (Original) The method of claim 1, wherein said individual has viral
2 hepatitis.

1 7. (Currently amended) The method of claim 7 6, wherein said individual is
2 infected with hepatitis C virus.

1 8. (Currently amended) The method of claim 7 6, wherein said individual is
2 infected with hepatitis B virus.

1 9. (Original) The method of claim 1, wherein said individual has
2 autoimmune liver disease.

1 10. (Original) The method of claim 1, wherein said individual has alcoholic
2 liver disease.

1 11. (Original) The method of claim 1, wherein said individual has a fatty liver
2 disease.

1 12. (Original) The method of claim 1, wherein said individual has drug-
2 induced liver disease.

1 13. (Original) The method of claim 1, wherein step (a) comprises determining
2 the level of α 2-MG protein in said sample.

1 14. (Canceled)

1 15. (Currently amended) The method of claim 14 13, wherein the level of α 2-
2 MG protein is determined using one or more anti- α 2-MG antibodies.

1 16. (Original) The method of claim 1, wherein step (a) comprises determining
2 a level of α 2-MG activity.

1 17. (Original) The method of claim 1, wherein step (b) comprises determining
2 the level of HA in said sample.

1 18. (Canceled)

1 **19.** (Currently amended) The method of claim ~~18~~ 17, wherein the level of HA
2 is determined using one or more HA-binding proteins.

1 **20.** (Currently amended) The method of claim ~~18~~ 17, wherein the level of HA
2 is determined using one or more anti-HA antibodies.

1 **21.** (Original) The method of claim 1, wherein step (c) comprises determining
2 the level of TIMP-1 protein in said sample.

1 **22.** (Canceled)

1 **23.** (Currently amended) The method of claim ~~22~~ 21, wherein the level of
2 TIMP-1 protein is determined using one or more anti-TIMP-1 antibodies.

1 **24.** (Original) The method of claim 1, wherein step (c) comprises determining
2 a level of TIMP-1 activity.

1 **25.** (Original) The method of claim 1,
2 wherein step (a) comprises determining the level of α 2-MG protein,
3 wherein step (b) comprises determining the level of HA, and
4 wherein step (c) comprises determining the level of TIMP-1 protein.

1 **26.** (Original) The method of claim ~~25~~ 25, wherein the level of α 2-MG protein,
2 HA and TIMP-1 protein each is determined using an enzyme-linked assay.

1 **27.** (Original) The method of claim 1, wherein a single sample is obtained
2 from said individual.

1 **28.** (Original) The method of claim ~~27~~ 27, wherein said sample is selected from
2 the group consisting of blood, serum, plasma, urine, saliva and liver tissue.

1 29. (Original) The method of claim 28, wherein said sample is a serum
2 sample.

1 30. (Currently amended) The method of claim 1, comprising differentiating
2 ~~no or mild liver fibrosis from moderate to severe liver fibrosis~~ F0-F1 fibrosis from F2-F4
3 fibrosis.

1 31. (Currently amended) A method of differentiating ~~no or mild liver~~
2 ~~fibrosis from moderate to severe liver fibrosis~~ F0-F1 fibrosis from F2-F4 fibrosis in an
3 individual, comprising the steps of:

4 (a1) (a) contacting an appropriate dilution of a sample from said individual with
5 anti- α 2-MG antibody under conditions suitable to form a first complex of α 2-MG and anti- α 2-
6 MG antibody;

7 (b) washing said first complex to remove unbound molecules;

8 (c) determining the amount of α 2-MG-containing first complex;

9 (d) contacting an appropriate dilution of a sample from said individual with a HA-
10 binding protein (HABP) under conditions suitable to form a second complex of HA and HABP;

11 (e) washing said second complex to remove unbound molecules;

12 (f) determining the amount of HA-containing second complex;

13 (g) contacting an appropriate dilution of a sample from said individual with anti-
14 TIMP-1 antibody under conditions suitable to form a third complex of TIMP-1 and anti-TIMP-1
15 antibody;

16 (h) washing said third complex to remove unbound molecules;

17 (i) determining the amount of TIMP-1-containing third complex; and

18 (j) differentiating ~~no/mild liver fibrosis from moderate/severe liver fibrosis~~ F0-
19 F1 fibrosis from F2-F4 fibrosis in said individual based on the amounts of α 2-MG, HA and
20 TIMP-1-containing complexes.

1 32. (Currently amended) A method of monitoring the efficacy of anti-fibrotic
2 therapy in a patient, comprising the steps of:

3 (a) detecting α_2 -macroglobulin (α_2 -MG) in a sample from a patient administered
4 an anti-fibrotic therapy;
5 (b) detecting hyaluronic acid (HA) in a sample from said patient;
6 (c) detecting tissue inhibitor of metalloproteinases-1 (TIMP-1) in a sample from
7 said patient; and
8 (d) determining the presence or severity of liver fibrosis in said patient based on
9 the presence or level of α_2 -MG, HA and TIMP-1, thereby monitoring the efficacy of anti-fibrotic
10 therapy.

1 33. (Original) The method of claim 32, further comprising comparing the
2 presence or severity of liver fibrosis determined in step (d) to the presence or severity of liver
3 fibrosis in said patient at an earlier time.

1 34. (Original) The method of claim 32, comprising detecting at most three
2 markers of fibrosis.

1 35. (Original) The method of claim 32, further comprising detecting in a
2 sample from said patient at least one marker selected from the group consisting of: PIIINP,
3 laminin, tenascin, collagen type IV, collagen type VI, YKL-40, MMP-3, MMP-2, MMP-
4 9/TIMP-1 complex, sFas ligand, TGF- β 1, IL-10, apoA1, apoA2, and apoB.

1 36. (Original) The method of claim 32, wherein step (a) comprises
2 determining the level of α_2 -MG protein in said sample.

1 37. (Original) The method of claim 36, wherein the level of α_2 -MG
2 protein is determined using one or more anti- α_2 -MG antibodies.

1 38. (Original) The method of claim 32, wherein step (b) comprises
2 determining the level of HA in said sample.

1 39. (Original) The method of claim 38, wherein the level of HA is determined
2 using one or more HA-binding proteins.

1 40. (Original) The method of claim 32, wherein step (c) comprises
2 determining the level of TIMP-1 protein in said sample.

1 41. (Original) The method of claim 40, wherein the level of TIMP-1 protein
2 is determined using one or more anti-TIMP-1 antibodies.

1 42. (Currently amended) A method of differentiating ~~no/mild liver fibrosis~~
2 ~~from moderate/severe liver fibrosis~~ F0-F1 fibrosis from F2-F4 fibrosis in an individual,
3 comprising the steps of:

4 (a) determining an α 2-MG level in a sample from said individual;
5 (b) determining a HA level in a sample from said individual;
6 (c) determining a TIMP-1 level in a sample from said individual; and
7 (d) diagnosing said individual as having ~~no/mild liver fibrosis~~ F0-F1 fibrosis
8 when said α 2-MG level is below an α 2-MG cut-off value X1, said HA level is below a HA cut-
9 off value Y1 or said TIMP-1 level is below a TIMP-1 cut-off value Z1,
10 diagnosing said individual as having ~~moderate/severe liver fibrosis~~ F2-F4
11 ~~fibrosis~~ when said α 2-MG level is above an α 2-MG cut-off value X2, said HA level is above a
12 HA cut-off value Y2 and said TIMP-1 level is above a TIMP-1 cut-off value Z2,
13 and diagnosing ~~remaining individuals~~ said individual as having an indeterminate
14 status when said α 2-MG level is above X1, said HA level is above Y1, and said TIMP-1 level is
15 above Z1 but said α 2-MG level is below X2, said HA level is below Y2 or said TIMP-1 level is
16 below Z2.

1 43. (Original) The method of claim 42, wherein said individual has a disorder
2 selected from the group consisting of viral hepatitis, autoimmune liver disease, alcoholic liver
3 disease, fatty liver disease and drug-induced liver disease.

1 **44.** (Original) The method of claim 43, wherein said individual is infected
2 with hepatitis C virus.

1 **45.** (Original) The method of claim 42, wherein said samples are
2 independently selected from the group consisting of blood, serum, plasma, urine, saliva and liver
3 tissue.

1 **46.** (Currently amended) The method of claim 45, wherein said α 2-MG[[],]
2 level, HA level and TIMP-1 level each is determined in a serum sample.

1 **47.** (Original) The method of claim 46,
2 wherein X1 is a value between 1.8 and 2.2 mg/ml;
3 wherein Y1 is a value between 31 and 39 ng/ml;
4 wherein Z1 is a value between 900 and 1100 ng/ml;
5 wherein X2 is a value between 1.8 and 2.2 mg/ml;
6 wherein Y2 is a value between 54 and 66 ng/ml; and
7 wherein Z2 is a value between 1415 and 1735 ng/ml.

1 **48.** (Original) The method of claim 47,
2 wherein X1=2.0 mg/ml;
3 wherein Y1=35 ng/ml;
4 wherein Z1 =1000 ng/ml;
5 wherein X2=2.0 mg/ml;
6 wherein Y2=60 ng/ml; and
7 wherein Z2=1575 ng/ml.

1 **49.** (Original) The method of claim 47,
2 wherein X1=2.0 mg/ml;
3 wherein Y1=37 ng/ml;
4 wherein Z1=1100 ng/ml;

5 wherein X2=2.0 mg/ml;
6 wherein Y2=60 ng/ml; and
7 wherein Z2=1575 ng/ml.

1 50. (Currently amended) The method of claim 42, wherein, ~~in a population~~
2 ~~having up to 30% liver fibrosis prevalence, at least 65% of individuals in said population~~
3 ~~are diagnosed as having no/mild fibrosis or moderate/severe fibrosis with an accuracy of at~~
4 ~~least 80% in a population having up to 30% liver fibrosis prevalence, X1, Y1, Z1, X2, Y2, and~~
5 ~~Z2 are independently selected to differentiate F0-F1 fibrosis from F2-F4 fibrosis in said~~
6 ~~individual with at least about 80% accuracy in at least 65% of the population assayed.~~

1 51. (Currently amended) The method of claim 42, wherein, ~~in a population~~
2 ~~having up to 30% liver fibrosis prevalence, at least 65% of individuals in said population~~
3 ~~are diagnosed as having no/mild fibrosis or moderate/severe fibrosis with an accuracy of at~~
4 ~~least 90% in a population having up to 30% liver fibrosis prevalence, X1, Y1, Z1, X2, Y2, and~~
5 ~~Z2 are independently selected to differentiate F0-F1 fibrosis from F2-F4 fibrosis in said~~
6 ~~individual with at least about 90% accuracy in at least 65% of the population assayed.~~

1 52. (Currently amended) The method of claim 42, wherein, ~~in a population~~
2 ~~having up to 30% liver fibrosis prevalence, at least 65% of individuals in said population~~
3 ~~diagnosed as having no/mild fibrosis or moderate/severe fibrosis with a positive predictive~~
4 ~~value of at least 90% and a negative predictive value of at least 90% in a population having~~
5 ~~up to 30% liver fibrosis prevalence, X1, Y1, Z1, X2, Y2, and Z2 are independently selected to~~
6 ~~achieve a positive predictive value of at least 90% or a negative predictive value of at least 90%~~
7 ~~for differentiating F0-F1 fibrosis from F2-F4 fibrosis in at least 65% of the population assayed.~~

1 53. (Currently amended) The method of claim 42, wherein, ~~in a population~~
2 ~~having up to 10% liver fibrosis prevalence, at least 70% of individuals in said population~~
3 ~~are diagnosed as having no/mild fibrosis or moderate/severe fibrosis with an accuracy of at~~
4 ~~least 90% in a population having up to 10% liver fibrosis prevalence, X1, Y1, Z1, X2, Y2, and~~

5 Z2 are independently selected to differentiate F0-F1 fibrosis from F2-F4 fibrosis in said
6 individual with at least about 90% accuracy in at least 70% of the population assayed.

1 54. (Currently amended) A method of diagnosing the presence or severity of
2 liver fibrosis in an individual, comprising the steps of:

3 (a) comparing a level of a first fibrotic marker ~~X~~ α 2-MG in said individual to a
4 cut-off value X1 to determine whether said individual is positive for ~~said first fibrotic marker~~
5 ~~X~~ α 2-MG;

6 (b) comparing a level of a second fibrotic marker ~~Y~~ HA in said individual to a
7 cut-off value Y1 to determine whether said individual is positive for ~~said second fibrotic~~
8 ~~marker Y~~ HA; and

9 (c) diagnosing the presence or severity of liver fibrosis in said individual based on
10 positivity or negativity for ~~X and Y, wherein, in a population with up to 40% fibrosis~~
11 ~~prevalence, at least 65% of individuals in said population are diagnosed with an accuracy~~
12 ~~of at least 90% α 2-MG and HA,~~

13 wherein in a population having up to 60% liver fibrosis prevalence, X1 and Y1
14 are independently selected, to diagnose the presence or severity of liver fibrosis in said
15 individual with at least about 70% accuracy.

1 55. (Currently amended) The method of claim 54, further comprising (d)
2 comparing a level of a third fibrotic marker Z in said individual to a cut-off value Z1 to
3 determine whether said individual is positive for said third fibrotic marker Z; and (e) diagnosing
4 the presence or severity of liver fibrosis in said individual based on positivity or negativity for ~~X,~~
5 ~~Y and Z~~ α 2-MG, HA, and Z.

6 wherein in a population having up to 60% liver fibrosis prevalence, X1, Y1, and
7 Z1 are independently selected to diagnose the presence or severity of liver fibrosis in said
8 individual within at least about 70% accuracy.

1 56. (Original) The method of claim 55, wherein said first fibrotic marker is
2 α 2-MG, said second fibrotic marker is HA, and said third fibrotic marker is TIMP-1.

1 **57.** (Original) The method of claim 55, wherein the levels of at least three
2 fibrotic markers are compared.

1 **58.** (Original) The method of claim 55, wherein the levels of three fibrotic
2 markers are compared.

1 **59.** (Original) The method of claim 55, wherein the levels of at least four
2 fibrotic markers are compared.

1 **60.** (Original) The method of claim 55, wherein the levels of at least five
2 fibrotic markers are compared.

1 **61.** (Currently amended) The method of claim 54, wherein said diagnosis
2 differentiates ~~no or mild liver fibrosis from moderate to severe liver fibrosis~~ F0-F1 fibrosis
3 from F2-F4 fibrosis.

1 **62.** (Currently amended) The method of claim 54 or claim 61, wherein, in a
2 population with up to 30% fibrosis prevalence, at least 65% of individuals in said
3 population are diagnosed with an accuracy of at least 93% the accuracy of diagnosing the
4 presence or severity of liver fibrosis in said individual is at least about 80%.

1 **63.** (Currently amended) The method of claim 54 or claim 61, wherein, in a
2 population with up to 20% fibrosis prevalence, at least 70% of individuals in said
3 population are diagnosed with an accuracy of at least 94% said population has up to 20%
4 liver fibrosis prevalence.

1 **64.** (Canceled)

1 **65.** (Currently amended) A method of diagnosing the presence or severity of
2 liver fibrosis in an individual, comprising the steps of:

3 (a) comparing a level of a first fibrotic marker ~~X~~ α_2 -MG in said individual to a
4 cut-off value X1 to determine whether said individual is positive for ~~said first fibrotic marker~~
5 ~~X~~ α_2 -MG;

6 (b) comparing a level of a second fibrotic marker ~~Y~~ HA in said individual to a
7 cut-off value Y1 to determine whether said individual is positive for ~~said second fibrotic~~
8 ~~marker Y; and HA~~;

9 (c) comparing a level of a third fibrotic marker TIMP-1 in said individual to a cut-
10 off value Z1 to determine whether said individual is positive for TIMP-1; and

11 (d) diagnosing the presence or severity of liver fibrosis in said individual based on
12 positivity or negativity for ~~X and Y~~ α_2 -MG, HA, and TIMP-1,

13 wherein said cut-off values ~~X1 and Y1 are optimized individually to give a~~
14 ~~desired performance characteristic~~ X1, Y1, and Z1 are independently selected to achieve an
15 optimized clinical parameter selected from the group consisting of sensitivity, specificity,
16 negative predictive value, positive predictive value, and accuracy.

1 66. (Canceled)

1 67. (Canceled)

1 68. (Original) The method of claim 65, wherein said cut-off values are
2 optimized using design of experiments (DOE) analysis.

1 69. (Original) The method of claim 66, wherein the levels of at least three
2 fibrotic markers are compared.

1 70. (Original) The method of claim 66, wherein the levels of three fibrotic
2 markers are compared.

1 71. (Currently amended) The method of claim 65, wherein said diagnosis
2 differentiates ~~no or mild liver fibrosis from moderate to severe liver fibrosis~~ F0-F1 fibrosis
3 from F2-F4 fibrosis.

1 72. (Currently amended) A method of diagnosing the presence or severity of
2 liver fibrosis in an individual, comprising the steps of:

3 (a) comparing a level of a first fibrotic marker ~~X α 2-MG~~ in said individual to two
4 cut-off values X1 and X2 to determine whether said individual is positive for ~~said first fibrotic~~
5 ~~marker X α 2-MG, wherein said individual is positive for α 2-MG when said level of α 2-MG is~~
6 ~~above X1 and X2;~~

7 (b) comparing a level of a second fibrotic marker ~~Y HA~~ in said individual to two
8 cut-off values Y1 and Y2 to determine whether said individual is positive for ~~said second~~
9 ~~fibrotic marker Y HA, wherein said individual is positive for HA when said level of HA is~~
10 ~~above Y1 and Y2; and~~

11 (c) comparing a level of a third fibrotic marker TIMP-1 in said individual to two
12 cut-off values Z1 and Z2 to determine whether said individual is positive for TIMP-1, wherein
13 said individual is positive for TIMP-1 when said level of TIMP-1 is above Z1 and Z2; and

14 (d) diagnosing the presence or severity of liver fibrosis in said individual based on
15 positivity or negativity for ~~X and Y α 2-MG, HA, and TIMP-1~~, wherein said cut-off values ~~X1,~~
16 ~~Y1, X2 and Y2 are optimized individually to give a desired performance characteristic X1,~~
17 ~~Y1, Z1, X2, Y2, and Z2 are independently selected to achieve an optimized clinical parameter~~
18 ~~selected from the group consisting of sensitivity, specificity, negative predictive value, positive~~
19 ~~predictive value, and accuracy.~~

1 73. (Canceled)

1 74. (Currently amended) The method of claim ~~73~~ 72, wherein said cut-off
2 values are optimized using design of experiments (DOE) analysis.